

lowing periodic phases were noted, as forming an annual cycle: (1) A winter phase with free diatoms in abundance; (2) a spring phase with *Spirogyra* dominant; (3) a summer phase with *Cladophora* dominant and epiphytes abundant; and (4) an autumn phase in which many of the earlier forms become active again after a latent period. These include *Spirogyra*, *Edogonium*, or other forms. The authors classify and discuss the factors that operate to produce these changes as seasonal, irregular, and correlated. This kind of continued work with small bodies of water is needed in this country; and our own members can make valuable contributions to the ecology of our micro-organisms by such investigations in the neighborhood of their homes.

DISTRIBUTION OF ROTIFERS

In the *Journal* of the *Queckett Microscopical Club*, C. F. Rousselet offers a discussion of the distribution of Rotifers. He calls attention to the fact that most species have quite a cosmopolitan range; and that no continent or climatic zone can really claim a peculiar rotatorian fauna. Even the rarer species are reported from widely separated regions of the earth. These facts are of course to be coupled with the ease with which Rotifers are transported. Some of them, as is known, are even capable of being dried out and of resuming life when conditions become favorable. Even in species in which this is not true there are resting eggs that resist both cold and drouth. The fact that the habitat of many Rotifers is such that they or their eggs are liable to be dried up once or oftener each year, and thus to be committed to the winds, is likewise an important factor.

RELATION OF VITALITY OF PARAMECIUM TO CONSTANCY OF SURROUNDINGS

Mr. L. L. Woodruff states, in the *Biological Bulletin*, that Paramecia kept for generations in a reasonably constant culture medium undergo cyclical changes in protoplasmic vitality; and finally die from internal causes. If, however, the culture medium is kept changing in such a way as to disturb this cycle, the lowering of vitality may be prevented and the protoplasmic life may be continued without any apparent decrease of vitality. Possibly the cycle leading to senility may even be eliminated altogether in this way.

He has cultivated *Paramecium* thru more than 1230 generations, which occurred at an average rate of more than 3 divisions in two days. These observations make it seem probable that in nature *Paramecium* does not undergo this lowering of vitality, because of the stimulus of changing external conditions.

NOTES ON THE TECHNIC OF TUBERCLE BACILLI

1. Gassi:

Make smear preparations;

Stain in warm eosin solution for one or two minutes. (To 5c.c. of 1 per cent eosin solution add a crystal of sublimate the size of a lentil.

Wash in water.

Treat with a mixture (0.5 vol. NaHo, 1 vol. potassium iodide, and 100 vols. of 50 per cent alcohol) until preparation assumes a pale green color.

Rinse carefully with alcohol, and wash with water.

Stain for two or three seconds in a solution:—methylen blue 1 vol.; abs. alcohol 10 vols.; 0.5c.c. hydrochloric acid and 90c.c. distilled water.

Wash thoroly and mount.

The tubercle bacilli are red, the rest blue.

2. Bernhardt's method of examining sputum:

Place 5c.c. of sputum and 20c.c. of a 20% solution of commercial antiformin in a stoppered bottle.

When homogeneous, pour in ligroin until a layer 3-5 mm. thick is formed.

Shake until well mixed, and allow to stand at temperature of room for $\frac{1}{2}$ hour.

Take out loop-fulls of the layer immediately beneath the ligroin. Fix, stain, and store the films in the usual way.

3. Hammerl's method of examining sputum:

Five parts of a solution, consisting of 99% ammonia and 1% caustic potash, is mixed with 1 part of sputum and vigorously shaken until homogeneous.

To 15c.c. of this mixture add 5c.c. acetone.

Centrifuge for half an hour.

Make films from the deposit and stain in the usual way.